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BRIEFER ARTICLES.

Notes upon the northwestern and Rocky mountain flora. I.—In the summer of 1892 I made a very interesting trip in the northwest. The months of June, July and August were spent in Idaho. My work in that state was done in the sage brush of the southern part, in the Owyhee mountains to the southwest, and in the highlands, foothills and mountains of the central and eastern portions. I traveled by railroad to the principal points, and by stage, carriage or horseback to more distant ones. Of course I walked a good deal. I was well provided with letters of introduction, and there was seldom any difficulty in procuring company whenever desirable, which was necessarily a great part of the time. During the entire season a collection of about eleven hundred species was made, two-thirds of which were from Idaho. Many of these are interesting from the fact that they show new and unexpected localities, and many for showing variations developed under changed conditions. Some plants seem to be quite new. I have learned to regard Idaho as a meeting place of various floras. There one meets with sub-arctic plants from the north which can even be traced to Siberia, and the Cacti and other southern plants are common. There is a large desert flora and also moist thickets and meadows with a most luxuriant vegetation. The Rocky mountain plants meet those of California. In general, I should say that its vegetation is most nearly allied to that of the Pacific slope.

I wish to express my appreciation of the kindness and encouragement I received both from my friends east of the Rockies, and from those I was so fortunate as to make in the state. Had it not been for their efficient assistance I could not have reached many of the distant and less accessible regions which I visited.

Very special thanks are due to Drs. Bessey, Britton, Trelease and Coulter. They not only gave me the best sort of encouragement at the beginning of my trip, but have since extended to me the privileges of their respective herbaria and libraries. My interest and pleasure in the plants have been greatly increased by the very free use I have made of these fine opportunities, which have made my work possible. I subjoin descriptions of a few of the plants from Idaho which I have been recently studying:

Oenothera Idahoensis, n. sp.—Perennial, caespitose, acaulescent or with stout stems 20–50^{mm} long, having young buds developed at base: leaves lanceolate, 12–20^{cm}, decurrent into a petiole, which is usually about one-third of entire length; irregularly cut and incised with sharp jagged teeth usually at right angles to the very prominent midrib; scab-

rous; lower side clothed sparsely and margins, midribs and petioles very thickly with a long, soft pubescence: calyx tips united, but lobes splitting in bud, and reflexed in flower; tube 10-14^{cm} long, very slender, considerably dilated at throat, lobes 45^{mm} long, narrow; delicate rose color; smooth on inner, hairy on outer surface and on tube: petals somewhat rhomboidal, emarginate, 45-50^{mm} long, 50-60^{mm} wide in dried specimen; white and delicately veined; stamens yellow, versatile, 12-14^{mm} long: capsule ovate, not attenuate or compressed, 30^{mm} long, 10^{mm} broad, very obtusely tetragonal in cross section; not winged but having two thick, tubercular, darker ridges with a depression between them, extending vertically at each angle; corky and hairy, tuberculate: seeds in two rows, angled, not crested, minutely tuberculate.

This belongs to the cespitose group, and I think must unquestionably be called the most beautiful representative of the genus *Oenothera*. I found it in but one locality and within a limited area. This was on the hills beyond Boisé City, at an elevation of about 3,000^{ft}. June.

Scutellaria Footeana, n. sp.—Perennial, from filiform subterranean stolons, 6-10^{cm} high, much branched, and spreading at base; branches dark, purplish; foliage light green: entire plant including inflorescence, clothed with a minute woolly pubescence: leaves 15-25^{mm} long, entire, oblanceolate to obovate above, cuneate to almost orbicular below; all tapering to a slender petiolate base, and lower ones distinctly petiolate: flowers axillary, numerous, 12-18^{mm} long, shorter than the subtending leaves: calyx in fruit a little longer than the peduncle; 6^{mm} long, 5^{mm} broad, nearly orbicular; angle and projection on back much less prominent than in most species: corolla amplexate-dilated at throat, with lower lip much broader than upper, and the two nearly equal in length; lemon yellow to dull brownish yellow at base, deepening to orange color in lobes; somewhat hairy within: nutlets acutely angled, roughly and deeply muricate upon faces and exterior surface; raised upon a much elevated slender gynobase, which appears like a prolongation of the style set upon the posterior side of a thick, scarlet cushion-like disk which bears white nectar glands upon its surface.

I find only two other species described as having their nutlets raised on a slender gynobase. These are *S. nervosa* Pursh of the Middle States, and *S. Guilielmi*, a Japanese species. Both differ from this in having nutlets surrounded by a conspicuous membranaceous wing; hence this cannot be placed in the same section with them according to Gray's definition in the Synoptical Flora.

This was found at an elevation of about 3,500^{ft} near Black Cañon, Boisé River, June 18th. I have named the plant in honor of Mrs. Mary Hallock Foote who planned, and accompanied me upon the pleasant expedition which led to its discovery.

Frasera cærulea, n. sp.—Stems slender, from a branching caudex; glabrous, or nearly so; 15-20^{cm} high, slender: leaves elongated, narrowly oblanceolate, slightly margined; the two or three cauline pairs 4-8^{cm} and the radical ones 10-16^{cm} long; those of the panicle re-

duced to linear bracts: inflorescence rather closely paniculate; pedicels as long or longer than flowers: sepals narrowly lanceolate with a conspicuous scarious margin: corolla blue; lobes ovate, acute, 6-8^{mm} long, with delicate, forked, spreading venation; glands linear, green; a little below middle, and extending nearly to base; the long villous fringe decurrent into a longitudinally adnate crown, with fringed free margins and saccate, tapering base, which has a longer and coarser fringe: a row of long setae between filaments at base: staminal scales obovate or nearly orbicular, laciniate; longer than ovary, nearly as broad as lobes of corolla: style slender, twice the length of ovary.

Found, July 9th, on Owyhee Mountains, several miles from the De Lamar silver mine, elevation 7,000^{ft}.

Frasera montana, n. sp.—Stem rather slender, 30-90^{cm} high: leaves opposite, elongated, strongly margined; lowest 15-20^{cm} long, narrowly oblanceolate; upper ones gradually reduced in size, linear: inflorescence paniculate: pedicels two or three times as long as the flowers: sepals narrowly subulate: corolla creamy white; lobes 6-8^{mm} long, nearly twice the length of the sepals, oblong, somewhat acute; bearing the small obovate glands near base; encircling fringe rather short, longer on the decurrent pocket-like base, strongly incurved: scales between bases of filaments very small, deeply cut into two, three or more setous processes.

This species appears to be more abundant than any of the preceding ones. I think I passed it more than once when traveling through the Boisé Basin, and I collected it in two places where it was growing rather plentifully. The fruit was developing on the side of the mountain above Cooper's Warm Springs, at an elevation of about 4,500^{ft}, July 20th, and the flowers were in the height of their beauty on a rocky ledge a few miles from Pioneer, 5,000^{ft} above sea level, July 22d.

The two *Fraseras* above described seem to form connecting links between the last two divisions of the genus in the Synoptical Flora. Both are long pedicelled, and thus have the loose inflorescence of the former, represented by *F. albomarginata*, to which the species I call *F. montana* is most nearly allied, and for which it might rather easily be mistaken on a superficial examination. Both show their relationship to the last division by the crown of scales at the base of corolla. This is small in *F. montana*, and very large in *F. cærulea*. The form and position of the glands show characteristic differences.

GILIA GRANDIFLORA Dougl.—This species is quite common on the foothills around Boisé City. As usually found there it accords very well with the type description. On the higher lands I found so many variations from the type that I could scarcely reconcile myself to classing them together under the one species. The variations are in size, in branching, in character and extent of the pubescence, and in size, number and position of the flower clusters. In all these intergrading forms, there is very little or no variation in the size and form

of the light salmon-colored corolla. I describe the most extreme form as

Var. *diffusa*, n. var.—Taller, stems much more slender, 75–100^{cm} high, much branched; branches long below, very short above; leaves linear, shorter, scattered; flowers in much smaller heads, at ends of branches, and summit of stem; glandular and cellular pubescence very thick upon the calyx, bracts, and upper leaves, and sometimes the entire upper portion of plant is pubescent.—A. ISABEL MULFORD, *Herbarium Lake Forest University*.

Frost Plants.—Prof. Lester F. Ward's observations on the "Frost freaks of the dittany," in the GAZETTE for April, 1893, occasioned much interest, since the phenomena illustrate one form of the movement of water in the plant stem. I have elsewhere¹ made a lengthy review of the literature of the frost plants and take occasion to call attention to the following references which may be accessible to the readers of the GAZETTE.

Prof. Ward called my attention to the fact that the frost crystals of *Cunila* and *Helianthemum* were noted by Dr. Darlington.² The first observation of frost phenomena recorded is that of Stephen Elliot on the stem of *Conyza bifrons* (now *Pluchea bifrons*).³ Sir John Herschel noticed a similar formation on the stalks of heliotrope and thistle.⁴ Prof. John Leconte made an extended study of the frost crystals of *Pluchea camphorata* and *P. bifrons*, in 1848, along the coast of South Carolina and Georgia.⁵ Prillieux in his investigations on freezing in intercellular spaces described the formation of radial ice plates by herbaceous plants.⁶ These observations were duplicated by Trecul at the same time, and Sachs has given some matter bearing upon this point.⁷ In a recent number of this journal Professor Atkinson gave a note recording the fact that these phenomena were seen by him in 1885–86,⁸ while Professor Ward has found that the frost freaks of the dittany are a matter of common information in the locality in which his observations were made.⁹

It seems established that the frost phenomena occur on plants which have ceased growing, or are wholly dead; that the movement of the water upward through the stem and laterally is wholly physical and

¹Quarterly Bulletin of the University of Minnesota. 2: 30. 1894. Science 22: 351. 1893.

²Flora Cestrica 350. 1837.

³Sketch of the Botany of South Carolina and Georgia. 322. 1824.

⁴London and Edinburgh Phil. Mag. III.—:110. 1833.

⁵Proc. A. A. A. S. 1850.

⁶Compt. rend. 70: 405. 1870.

⁷Lehrbuch, 2 Aufl. 614.

⁸Bot. Gaz. 19: 40. 1894.

⁹Science 23: 66. 1894.